Discussion on (Terra, Aqua, Suomi NPP) VIIRS and Future Developments

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National Aeronautics and Space Administration HQ
MODIS-VIIRS Science Team Meeting
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ROSES 2013 A.28 The Science of Terra and Aqua & A.46 Terra and Aqua: Algorithms – Existing Data Products

- **A.46 - Terra and Aqua Algorithms – Existing Data Products (4-year)**
  - Evolution and migration to the Senior Review proposals (2017)
  - Statistics - A. 46 Proposals Recommended: 32/38 ($19.4M/4 yrs selected - $5.2/5.4/5.0/3.8M)
- **A.28 – The Science of Terra and Aqua - recompetition in ROSES 2016**
  - 2.1 Science Data Analysis
  - 2.1.1 Multiplatform and Sensor Data Fusion
  - 2.2 Algorithms – New Data Products
  - 2.3 Real- or Near-Real-Time Data Algorithms
  - Statistics - A. 28 Proposals Recommended: 56/212 ($34.96M/3 yrs selected - $11.5 /11.7 / 11.75M)
- **A.29 – Suomi National Polar-orbiting Partnership (NPP) Science Team and Science Investigator-led Processing Systems for Earth System Data Records From Suomi NPP - recompetition in ROSES 2016**
  - Development of science quality standard data products using Suomi NPP measurements - enable continuity of key standard ES data records from NASA's EOS Terra, Aqua, and/or Aura satellites
  - Development and demonstration of innovative & practical applications of Suomi NPP measurements
  - Development of other new science data products from Suomi NPP measurements to meet high-priority Earth science needs
  - Suomi NPP Science Team Leader and Discipline Leads
  - Statistics - A. 29 Proposals Recommended: 45/119 ($30M / 4 1/3 yrs selected)

ROSES 2016/2017 – A.X The Science of Terra, Aqua, and Suomi NPP (?)

- ~ $15M estimated (roughly) could be available in FY17 (~$8M lien)
- A.46 – Terra and Aqua: Algorithms – Existing Data Products
  - Migrate existing selectees to 2017 Senior Review at budget (estimated $3-4M/yr total, - $3.8M in FY17)
- A.X The Science of Terra (MODIS, ASTER, MOPITT, MISR, CERES), Aqua (MODIS, AIRS/AMSU, CERES) and Suomi NPP (VIIRS, CrIS, ATMS, CERES, and OMPS) *move OMPS to Aura ST suggestion
  1. Science Data Analysis (including and stressing topic on Multiplatform and Sensor Data Fusion)
  2. Algorithms–New Data Products
  3. Real-or Near-Real-Time Data Algorithms

Specific to Suomi NPP is/are:

4. Developing standard data products for EOS continuity
5. SIPS
6. Science Team Leader and Five Discipline Groups

#4 and #6 could be blended with #1-3 in to an omnibus for Terra, Aqua, and Suomi NPP.
OR #4-6 could be called out in separate subelement (Suomi NPP topics only).

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ROSES 2016/2017 – A.X The Science of Terra, Aqua, and Suomi NPP (?)

- **2017 Senior Review – Terra and Aqua: Algorithms – Existing Data Products**
  - **Migrate existing selectees to 2017 Senior Review at budget (estimated $3-4M/yr total, - $3.8M in FY17)**

- **ROSES 2016 A.X The Science of Terra (MODIS, ASTER, MOPITT, MISR, CERES), Aqua (MODIS, AIRS/AMSU, CERES) and Suomi NPP (VIIRS, CrIS, ATMS, CERES, and OMPS)**
  1. **Science Data Analysis (including and stressing topic on Multiplatform and Sensor Data Fusion)**
  2. **Algorithms–New Data Products**
  3. **Real-or Near-Real-Time Data Algorithms**
  4. **Developing standard data products for EOS continuity**
  5. **Science Team Leader and Five Discipline Groups**

- **Suomi NPP OMPS to Aura ST suggestion**

- **$23M total estimate, minus the $3-4M for Existing Algorithms on T&A, plus OMPS**
- **JPSS**

Scientific Challenges for SR Transition plus next Program Element(s)

- **Transition core standard algorithms (A.46) to the Senior Review**
  - **How do we identify what algorithms are ready, or did we already do that by running the separate competition?**
  - **How to keep costs down to real maintenance work and MINOR associated validation**
  - **Each proposal/PI should clearly identify the algorithm(s) being transitioned**
  - **Algorithm history must be clear**
  - **Is the approach the "state-of-the-art"?**
  - **Is 3-4M/yr enough? Too much?**
    - **2009 - $15M/yr available, 21 algorithm proposals selected (over 1/3 of available budget)**
    - **2013 – $2.5M/yr available, 32/38 selected (nearly double the $2.5M advertised budget)**
  - **Does this hold for all instruments – meaning can we easily identify those x of 81 (or all) algorithms and minor calibration/validation activities ready for transition to Senior Review?**
- **Orphaned algorithms and other activities that were not recommended:**
  - **MODIS Oceans NPP**
  - **MODIS Near-IR water vapor and cirrus reflectance**
  - **Validation of VI (MOD13)**
  - **Evaluate / improve MOD16 ET product**
  - **AIRS NH_3**
  - **MODIS Angstrom Exponent**
  - **Surface Emissivity**

ROSES 2016/2017 Plan for A.28 The Science of Terra and Aqua & A.46 Terra and Aqua: Algorithms – Existing Data Products + A.29 Suomi NPP

- **Potential major issues**
  - **Are we convinced scientifically all T&A Existing Algorithms are ready for the SR?**
  - **Uncosted carryover + future strategy with the forward funding opportunities**
  - **We may need to ask PIs to reconcile in their proposals how a proposal that wants to focus on Earth System Data Records for a data product(s) (Terra – Aqua – Suomi NPP – JPSS (?)) wil divide labor if supporting multiple missions; or if the proposed work overlaps with an existing, already funded proposal, if selected, can the PI show a division of work and funding for the new research (we have done this before with T&A and Suomi NPP),**
  - **Many PIs will propose one algorithm or approach or proposal to the omnibus and may lose, so we may have some unfunded folks/orphaned products out there**
  - **Proposal numbers may be huge**
  - **Suomi NPP – Senior Review? If yes, then what is the status of the algorithms, ready for SR transition? ATBD and documentation on web sites?**

- **Timing – likely late calendar 2016 release for the amendment "The Science of Terra and Aqua, Suomi NPP, and JPSS".**

A. 29 Suomi NPP Standard Products (Land)

EOS Standard Level 2 and Level 3 Land Data Products Selected for Suomi NPP:

- Surface Reflectance (Vermote - #86; Next Generation: Lyapustin - # 96)
- Snow Cover (Hall, D. - # 49)
- Land Surface Temperature and Emissivity (Hulley - # 106)
- Land Cover and Dynamics (Dynamics only: Zhang, X - # 87)
- Vegetation Indices (Didan - # 68)
- Fire and Thermal Anomalies (Schroeder - # 29)
- Leaf Area Index (LAI) and Fraction Absorbed Photosynthetically Active Radiation (FPAR) (Myneni - # 9)
- Sea Ice Cover and Ice Surface Temperature (Hall, D. - # 49)
- BRDF (Bi-directional Reflectance Distribution Function) / Albedo (Schaaf - # 94)
- Vegetation Continuous Fields No selection
- Burned Area (Giglio - # 35)

A. 29 Suomi NPP Standard Products (Ocean)

EOS Standard Level 2 and Level 3 Ocean Data Products Selected for Suomi NPP:

- Sea Surface Temperature (Minnett - # 79; Next Generation: Harris - # 41 and Wentz – # 19)
- Aerosol Angstrom Exponent (Franz - #77)
- Aerosol Optical Thickness (Franz - #77)
- Subsurface Chlorophyll *a* Concentration (Gregg - # 38; Hu - # 64; Franz- # 77)
- Diffuse attenuation at 490 nm (Lee - # 56; Franz - # 77)
- Photosynthetically Available Radiation (Frouin - # 3)
- Particulate Inorganic Carbon (Balch - # 33)
- Particulate Organic Carbon No selection
- Remote Sensing Reflectance (Hu - # 64; Franz - # 77)

A. 29 Suomi NPP Standard Products (Atmosphere)

EOS Standard Level 2 and Level 3 Atmosphere Data Products (from MODIS) Selected for Suomi NPP:

- Aerosol Product (Levy - # 43; Hsu - # 20; Next Generation: Lyapustin - # 96)
- Total Precipitable Water (Water Vapor) (Borbas - # 73)
- Cloud Product (Platnick - #26; Baum - #1; Gao - # 45)
- Atmosphere Gridded Product No selection
- Cloud Mask (Platnick - # 26)

Terra and Aqua & Suomi NPP VIIRS Algorithm Continuity

- **Orphaned algorithms and other activities that were not recommended/ proposed:**
  - **Oceans NPP**
  - **Near-IR water vapor and cirrus reflectance**
  - **Validation of VI (MOD13)**
  - **Evaluate / improve MOD16 ET product**
  - **AIRS NH3**
  - **MODIS Angstrom Exponent**
  - **Surface Emissivity**
  - **VIIRS:**
  - **Atmosphere Gridded Product**
  - **Land Cover**
  - **Vegetation Continuous Fields**
  - **Atmospheric Pressure Vertical Profiles**
  - **Particulate Organic Carbon**
  - **Aerosols from OMPS**

Do we continue to produce these without an algorithm PI to manage?

For the products that we can attempt MODIS to VIIRS continuity, sounds as if many of these efforts are pushing ahead; however, quality assessments are underway in parallel, and more time is needed….

Continuity (MODIS to VIIRS2038)

- Goal: Earth System Data Records
- How do we get there?
  - Measurements need to be sustained over decades - consistency
  - Quantify instrument and measurement performance (e.g. calibration, stability)
    - MCST and VCST continuity critical
  - Need to be able to validate our space-based estimated Earth system properties
  - Acquired from multiple sensors / datasets
    - Plankton, Aerosols, Clouds, ocean Ecosystem mission – PACE (and land capabilities?)
    - Non-US sensors/missions
- MODIS-T and A are old (DS working)
- Suomi NPP VIIRS – "assessments" of continuity data products (& new) underway
- Are all VIIRS created equal (MODIS-T v. MODIS-A)
- Does VIIRS have the capability to produce all MODIS/EOS continuity data products?
  - If it does not, what is the solution?
  - If it does, then great, but there may be challenges to producing a given product (no PI to maintain/improve, time needed for assessment and continuity, etc.)
- Uncertainties associated with data products (expect this in the next call…)
- NOAA Data products – different? Better? Worse? Funding?

Issues/Challenges/Feedback arising from this meeting

- **Land – MODIS –**
  - **New products (Incoming solar radiation, LST) + improvements to existing products (MOD21)**
  - **Quit producing MOD11 (?) new ATBD? User group? Sub with MOD21 after 1-yr overlap. Global production, tracking ATBDs, etc. Make clear decision at right point to "turn off" MOD11**
  - **Time series trend analyses – MODIS to VIIRS (collection processing sign change) – stress on long-term "climate" changes. Link to policy relevant science**
    - **Requires rigorous calibration and tracking of sensor degradation (characterization)**
  - **Wetlands (where land meets water)**
  - **Link to CEOS and international community**
- **Land – VIIRS**
  - **Maturity of products developing (BRDF, Albedo); some discrepancies (LAI/FPAR)**
  - **By end of funding all continuity and new data products will be produced publicly at least once – more evaluation needed for "continuity"**
  - **Need for operational production (wildfire)**
  - **Product validation impacted by lower budgets – leverage international efforts (NOAA)**
  - **Web sites updated – documentation PRIOR to recompetition**
    - **MODIS Product/ Corresponding VIIRS product / Comments / NASA funded and related research / References**
  - **Changing projections (geographic) and Collection 7?**
  - **Partnership w/NOAA? – suggestion that NOAA NDE will provide NASA quality data prods?**
  - **Aqua to AM orbit for MODIS (but other risks/impacts?)**
  - **IDS aspect of our science**

Issues/Challenges/Feedback arising from this meeting

- **Oceans –**
  - **Science:**
    - **Validation challenging for VIIRS (lack of match ups) – need for new autonomous instruments**
    - **MODIS-Terra still not heavily used**
    - **Validation SST – limited/challenging sampling – challenges with instrumentation?**
    - **Data Assimilation- temporal and spatial product coverage**
  - **Meeting:**
    - **State of data records – data quality on MODIS in question**
    - **Cal/val data need – and where?**
    - **Feedback on data formats, quality (error propagation through algorithms)**

Issues/Challenges/Feedback arising from this meeting

- **Atmosphere –**
  - **Aerosols and Cloud Products making good progress (deep blue, dark target)**
  - **TPW ready for global processing – cross sensor/blended data for maximizing product**
  - **Nightlights – producing at NOAA (monthly scale) – how to get data?**
  - **Cirrus detection – orphaned for MODIS but supported for VIIRS – need for continuity product from MODIS**
  - **Level 2 data formats and metadata**
  - **Subsampled products**
  - **Calibration- impacts of step changes and other anomalies for products (recent trending)**
  - **MODIS future selections – continuity to VIIRS (spectral differences) – example of cloud top height**

NRC Decadal Survey

- **Decadal Survey for Earth Science and Applications from Space (NASA, NOAA, USGS) – goes from 2015-2017 to address 2017-2027 priorities**
  (http://sites.nationalacademies.org/DEPS/ESAS2017/index.htm)
- **What IS the status of VIIRS relative to MODIS data?**
  - **Are the EOS continuity data products of equal quality?**
  - **If not, what will it take to get them there?**
  - **If impossible, how do we fill the gap (and will it lead to innovation)?**
- **Steering Committee is set – Co-chairs are Waleed Abdalati (University of Colorado, Boulder) & ?**
- **Panels:**
  - **Global Hydrological Cycles and Water Resources**
  - **Weather and Air Quality: Minutes to Subseasonal**
  - **Marine and Terrestrial Ecosystems and Natural Resource Management**
  - **Climate Variability and Change: Seasonal to Centennial**
  - **Earth Surface and Interior: Dynamics and Hazards**

Meeting Frequency

- After selection
- 18-month mark
- Focused workshops as needed
- Before recompetition?

Back-Up

MODIS-VIIRS Measurement Teams

Historical Philosophy: Continuing/evolving measurement streams, there should be one science team, competed periodically, that provides scientific guidance to present and future missions and for the utilization of past data sets

- Support and focus on Earth System Data Records
- Data system to ensure a “seamless” time series
- Scientific guidance and priorities must represent broad user community (including outside of NASA/U.S.)
- Suomi NPP VIIRS continuity, DS missions, CI missions, international missions
  - T&A/Suomi NPP Competition circa ROSES 2016/2017
- JPSS – VIIRS continuity out to 2038, no plans for NASA ST

ATBD/Data Product Documentation & Reviews

- **ATBD/Data Product Documentation and Reviews:**
  - Documentation on web sites lacking for Sensor/Team/ATBDs/Data – new (and existing?) users (especially in the applied/operational world) need to find the details
  - Could we envision something like this on line:
  - MODIS PRODUCT / CORRESPONDING VIIRS PRODUCT / COMMENTS / NASA funded & RELATED RESEARCH / REFERECES
  - Snow Cover (MOD10A) / Snow Cover (VIIR99) / Loss of spatial resolution, no loss of accuracy / D. Hall currently doing VIIRS error assessment
  - Land: ATBD and User Guides

  MUST list key references – ex. Snow cover see Hall et al 2014, Painter et al 2015

  - PI's maintain algorithm data on central page (MODIS? VIIRS? Pointers)

  - Review of algorithms for new & alternative MODIS (VIIRS) algorithms
  - Is the structure of the original EOS ATBDs needed? Can each disciplinary community propose an approach like the above?
  - New algorithms/data products – draft new proposals, documentation and requirements, follow with review and endorsement by user communities (benchmarking).
  - Is there a need for periodic review of ATBDs/Algorithms off-cycle of the competition?
  - What about the guidance we should include in the next competition?

Outstanding Programmatic/Senior Review Issues – Terra

- **Terra's fuel reserves will drive a question we need to answer by 2017: how important is it to continue the Terra data record (which of course includes MODIS) with a tightly-controlled 10:30 MLT?**
- **Could lower the s/c which leaves it closer to the constellation, but still safe – BUT needs additional waivers for violating international orbital debris standards. If we get waivers, ESMO's new approach will continue to maintain 1030 MLT until 2021, which would give us a 20-year data record with a tightly-controlled, consistent MLT. Total operational lifetime of Terra would be the same (whatever approach used) - post-mission lifetime will increase by 20 years.**
- **Senior Review panel recommended NASA quantify the impact to the CDR quality of the Terra datasets if the MLT drifts off 1030 beginning in 2018, compared to 2021.**
- **Fate of the waiver to extend the Terra mission at the current 705 km altitude.**
  - **Waiver is approved - Terra will maintain the 10:30 MLT for 3 additional years and continue to provide a long term uninterrupted data record.**
  - **Waiver is denied - Terra would continue to collect high quality data of sufficient value to the science community to warrant extension - orbital change would compromise continuity of the stable long term climate record at some level, but additional information necessary to fully assess the significance of this degradation (workshop of stakeholders)**

- **What do we do for a MODIS-quality instrument in the morning orbit when Terra is done?????)**

Scientific Issues for future T&A & Suomi NPP Program Elements

- Algorithm history needs to be clear – continuations requested with no work showing history to core algorithm(s)
- Algorithm improvement needs to be clear – continuations requested with no work showing progress or improvement to uncertainty(ies) in core algorithm(s)
  - All proposals must quantify errors and uncertainties associated with proposed efforts (e.g., the data products themselves, any scientific data analysis, etc.)
  - Or can we just start with assumptions/qualitative analysis?
- Algorithm relevance needs to be clear –people will use the product, but what for?
- Is the approach at the state-of-the-art – is there a better approach/data product NASA should be considering? Do we continue to produce standard products if they are "inferior" or not innovative (think about operational uses and the time it takes to transition a new model to operations)
- What's the cost associated with progress relative to the science return?
- Transition core standard algorithms to the Senior Review
  - A range of cost ($50-550K/yr) with individual core algorithm proposals and MINOR associated calibration/ validation activities
- Can we link current and future sensors, Aqua to Suomi-NPP to JPSS or other mission for continuity?
- Interdisciplinary and multidisciplinary science

Issues for MODIS-VIIRS Science Team

- Terra's future data quality for MODIS assessment in community workshop (waiver on MLT/altitude adjustment)
- Evolution/migration of Existing Algorithms to Senior Review (2013 program element, A.46 as intermediate step) – we have to weigh investments versus potential outcomes
- Continuity of products and orphan products (from MODIS and VIIRS)
- Algorithm developers and validation investigators should continue to address important deficiencies in key data products (uncertainties)
- Algorithm developers need to represent broader community needs by working with them
- How best to facilitate interdisciplinary science and algorithm development approaches, Terra/Aqua intersensor science (2.1.1)
- Established web site(s)/process for regular data product and algorithm reviews -need to maintain, evolve, refine, review data products as needed (but can no longer say "go to the literature")
- MODIS and Suomi NPP VIIRS website and data product documentation – updated and coordinated with discipline leads, team leader, project scientists, and PIs – more user friendly
- Evolution to measurement teams and blend with MODIS-VIIRS Team (w/other mission teams)
- Reprocessing – "staged delivery"

Instrument and Science Measurement Teams

- Additional detailed guidance for the Instrument and Science Measurement Teams were provided in the disciplinary Sections.
- Proposed studies may be relevant to more than one team. Proposals should request membership on the team that, to the best of their knowledge, is most relevant to their research.
- Specific guidance was in each section, and identify if the proposer called out membership in a particular science team
  - Land Measurements Team
  - Ocean Biology and Biogeochemistry Measurement Team (OCRT)
  - Cryospheric Sciences Measurement Team
  - Atmospheric Sciences Measurement Team
  - Geodynamics and Geohazards Research Team
  - Biodiversity and Ecological Forecasting Team
  - Sea Surface Temperature Science Team

Move from Missions to Measurements due to Mission and Science Maturity

ATBD/Data Product Reviews, Documentation

- **ATBD/Data Product Reviews:** Review of algorithms for new & alternative MODIS (VIIRS) algorithms
  - Is the structure of the original EOS ATBDs needed? Is there an alternative approach and would one approach for documenting data products (provisional or continuity) serve all disciplinary communities?
  - New algorithms/data products – draft new proposals, documentation and requirements, follow with review and endorsement by user communities (benchmarking)
  - Is there a need for periodic review of ATBDs/Algorithms off-cycle of the competition?
  - Documentation on web sites lacking for Sensor/Team/ATBDs/Data – new users (applied)

- Could we envision something like this on line:
- MODIS PRODUCT / CORRESPONDING VIIRS PRODUCT / COMMENTS / NASA funded & RELATED RESEARCH / REFERECES
  - Snow Cover (MOD10A) / Snow Cover (VIIR99) / Loss of spatial resolution, no loss of accuracy / D. Hall currently doing VIIRS error assessment
  - Surf. Temp (MOD11x) / Surf Temp (VIIR00) / Loss of spatial resolution, some increase in error / USDA working on merging w/Microwave sensors to create enhance product

MUST list key references – ex. Snow cover see Hall et al 2014, Painter et al 2015

  - PI's maintain algorithm data on central page (MODIS? VIIRS? pointers)

MODIS-VIIRS Measurement Teams

Historical Philosophy: Continuing/evolving measurement streams, there should be one science team, competed periodically, that provides scientific guidance to present and future missions and for the utilization of past data sets

- Support and focus on Earth System Data Records
- Data system to ensure a "seamless" time series
- Scientific guidance and priorities must represent broad user community (including outside of NASA/U.S.)
- Suomi NPP VIIRS continuity, DS missions, CI missions, international missions
  - Thought to jointly compete MODIS and Suomi NPP next round
- Plans for JPSS – VIIRS continuity out to 2038, but plans for a NASA-based Science Team?

Issues for MODIS-VIIRS Science Team

- Terra's future data quality for MODIS assessment in community workshop (waiver on MLT/altitude adjustment)
- Evolution/migration of Existing Algorithms to Senior Review (2013 program element, A.46 as intermediate step) – we have to weigh investments versus potential outcomes
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- Established web site(s)/process for regular data product and algorithm reviews -need to maintain, evolve, refine, review data products as needed (but can no longer say "go to the literature")
- Evolution to measurement teams and blend with MODIS-VIIRS Team (w/other mission teams)
- MODIS and Suomi NPP VIIRS website and data product documentation – updated and coordinated with discipline leads, team leader, project scientists, and PIs – more user friendly

Scientific Issues from T&A Program Elements

- **Reviewer feedback:**
  - **"incremental improvement" – what is this? Is it quantified? What's the cost associated with progress relative to the science return?**
  - **Innovation – maybe, maybe not, but is the work plan justified?**
  - **"approach far from state of the art" – is there a better approach/data product NASA should be considering?**
  - **Continued work showing no history or progress or improvement to uncertainty(ies) in core algorithm(s)**
  - **All proposals submitted in response to T&A and S-NPP solicitations must quantify errors and uncertainties associated with proposed efforts (e.g., the data products themselves, any scientific data analysis, etc.). The error and uncertainty discussion must be clearly identifiable in a separate section within the proposal body. Explicit attention will be given to this section during the review process**
  - **Relevance weak – we know people will use the product, but does the author say anything about it? "x product important for a CDR", but the authors do not describe**
  - **Link to current and future sensors, Suomi-NPP or JPSS or other mission for continuity?**
  - **Cal/Val work – probably the *in situ* component is important but team may not give details or say why**

Standard Products (Ozone)

EOS Standard Level 2 and Level 3 Atmosphere Data Products (from OMPS) Selected for Suomi NPP:

- Total Column Ozone (McPeters - #72)
- Ozone Concentration Vertical Profiles (Bhartia - #21, McPeters - #72)
- Aerosol Concentration Vertical profiles No selection
- NO_2 Total Column (Yang - #13)
- Sulfur Dioxide Total Column (Yang - #13)
- Aerosols Total Column (UV) No selection

Standard Products (Sounder)

EOS Standard Level 2 and Level 3 Sounder Data Products Selected for Suomi NPP:

- **Atmospheric Temperature (vertical profiles) (Barnett - # 28, Susskind - # 99, Lambrigtsen, #39; Next Generation: Moncet - # 82)**
- **Atmospheric Moisture (vertical water vapor profiles, total precipitable water, total cloud liquid water) (Barnett - # 28, Susskind - # 99, Lambrigtsen, #39; Next Generation: Moncet - # 82)**
- **Atmospheric Pressure Vertical Profiles (None)**
- **Surface Temperature (Barnett - # 28, Susskind - # 99, Lambrigtsen, #39; Next Generation: Moncet - # 82)**
- **Cloud Properties (fractional cover, cloud top temperature, cloud top height) (Barnett - # 28, Susskind - # 99, Moncet - # 82)**

Cal/Val, Applications & New Products

- Calibration and validation of VIIRS Surface Reflectance product (Czapla-Myers, #66)
- Validation of VIIRS thermal infrared data and products (Hook, #6)
- Calibration of VIIRS against the moon (Stone, #104)
- CrIS radiometric calibration under cloudy conditions (Aumann, #27)

- Agricultural Monitoring Applications (Justice, #58)
- Air Quality and Public Health Applications (Wang, J., #67)

- VIIRS Nighttime Lights (Elvidge, #120)
- NH_3 and CO from CrIS (Cady-Pereira, #4)
- Combine Data Assimilation with an Algorithm to Improve the Consistency of VIIRS Chlorophyll (Gregg, #38)

Standard Products Not Selected

- Atmosphere Gridded Product
- Land Cover
- Vegetation Continuous Fields
- Atmospheric Pressure Vertical Profiles
- Particulate Organic Carbon
- Aerosols from OMPS

ROSES-2013 A.29 Suomi NPP Statistics

Proposals Due: March 10, 2014
Number Proposals Received: 119
Selection Date: August 12, 2014
Proposals Selected: Science Team - 40 of 113; SIPS - 5 of 6

Science Team PI Distribution (35% success rate):

Universities	17	Other Gov't. Agency	3
NASA Centers	15	Non-Profit:	1
For-Profit Corp.	4		

Product Type Distribution:

EOS Continuity Products (includes cal/val)	35
Innovative and Practical Applications:	2
Other Products	3

SIPS PI Distribution (83% success rate):

Universities	1	NASA Centers	4